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WATER BUDGET ANALYSIS FOR SALT MANAGEMENT WITHIN THE WESTSIDE SAN JOAQUIN RIVER REGION, CALIFORNIA

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ABSTRACT: Developing control options for salt management in large, arid river basins requires the assimilation and analysis of hydrology and salinity data from agricultural operations, urban areas, and managed seasonal wetlands. Models are commonly used to improve our collective understanding of salinity fluxes within a watershed as water passes from river or canal diversion to the place of use and, ultimately, as surface or subsurface return flow to the river that drains the watershed. Populating these models with reliable data is challenging, especially when basin-level disaggregation is at the water district level. In our water budget analysis for salt management within the Westside San Joaquin River region, two models were chosen for their capabilities and their level of acceptance with stakeholders: WESTSIM, a surface-groundwater model accounting for agricultural- and urban-driven hydrology (based on the California Department of Water Resources Integrated Water Flow Model, version 3.02) and the Watershed Analysis Risk Management Framework (WARMF) model , a physically based watershed model that simulates hydrology and water quality transport and transformations through the land and surface waters of a river basin. Major challenges in this effort to understand salinity fluxes included resolving water budgets for the two models, with different theoretical constructs for groundwater recharge, estimation of irrigation return flows for water districts with water surpluses, and calculating subsurface drainage return flows under deficit irrigation. Achieving closed water and salt mass balances required questioning assumptions regarding agricultural water management practices in the region.

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